FRD ACTIVITIES REPORT
July - September 2012

RESEARCH PROGRAMS

NOAA/DOE Wind Forecast Improvement Project

The last regularly scheduled visit for maintenance activities to the FRD WFIP sites in Texas was performed in mid-July by Dennis Finn. Routine maintenance and data acquisition activities were conducted at the Jayton and Brady sites. At the Colorado City site, the extensive equipment damage resulting from the 21 June electrical storm was repaired and normal operations and communications were restored. In mid-September, Kirk Clawson, Dennis Finn, Shane Beard, and Tom Strong traveled to Texas -September to close out the field measurements and retrieve all of the equipment for return to Idaho Falls. Except for the extended outage at Colorado City, data recovery was very good for all measurements during the quarter.

Sodar and surface flux measurement data from the sonics covering the periods from late May to mid-July and from mid-July to mid-September were provided to Will Pendergrass at ATDD and Jeff Freedman from AWS Truepower in support of their research activities. (dennis.finn@noaa.gov)

High Performance Computing

As noted in previous reports it was not possible to easily optimize HYSPLIT for parallel GPU computing due to the existing serial structure of the code. As a result, the research effort at Boise State University shifted focus to the development of a general purpose Lagrangian dispersion kernel that could be used in a future version of HYSPLIT optimized for parallel processing with GPUs, or with other geophysical dispersion models. This effort was completed late in the 3rd quarter and tested and refined in the 4th quarter. If additional HPCC funding becomes available in the next funding cycle, the plan is to integrate the turbulence, deposition, and other routines in HYSPLIT with the Lagrangian dispersion kernel for a GPU-ready version of HYSPLIT. (dennis.finn@noaa.gov, Rick Eckman, Roger Carter)

Transport and Dispersion Modeling

A draft Software Quality Assurance (SQA) plan for ARL HYSPLIT was developed in collaboration with Roland Draxler from ARL headquarters. This will provide the basis for a gap analysis that is part of the process for being granted formal acceptance of ARL HYSPLIT within the DOE's Subcommittee on Consequence Assessments and Protective Actions (SCAPA) consequence assessement model toolbox. The SQA and User's Guide documentation for the implementation of NOAA/INL EOC HYSPLIT were also updated during the quarter. The updates were to version 1.1, consistent with the current operational version. (dennis.finn@noaa.gov)

Testing of all facets of the NOAA/INL EOC HYSPLIT implementation using the formal protocol described in version 1.1 of the SQA continued during the quarter. A shared Google Docs form is being closely monitored for identifying any anomalies or problems that occur during testing by any user. A problem tracking log and a new software requirements document are now being maintained on a routine basis. Several problems were identified by testing during the quarter but most were relatively minor and all were resolved. (dennis.finn@noaa.gov)

Mesoscale Forecast Modeling

Work continues on developing probabilistic point forecasts based on output from the WRF system running at FRD. The WRF forecasts have both biases and random errors that can be estimated by comparisons with data from the NOAA/INL Mesonet. The probabilistic algorithm uses the past performance of the WRF model to adjust the current forecast to account for model bias. It also computes ranges for the forecast variables based on the random errors observed in the past. The algorithm is continually updated based on the most recent model performance. (richard.eckman@noaa.gov)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

Emergency Operations Center (EOC)

Weather forecast support for the Midway Wildland Fire located on the southern end of the INL began on July 11. Forecasts were provided throughout the day as weather conditions changed due to local thunderstorms in the area. By the afternoon of July 12, the fire began to grow rapidly and approached several structures on the INL. As a result, the EOC was partially activated. Team B was called into the EOC to provide rapid weather forecast support through that afternoon. (Jason.Rich@noaa.gov and Kirk.Clawson@noaa.gov)

A FRD meteorologist assigned to INL Emergency Response Organization (ERO) Team B participated in a drill at the EOC on August 22. The drill scenario centered around a boiler explosion at SMC and a subsequent leak of Americite, a chemical added to boiler water to prevent rust. Nowcasts and short-term weather forecasts were provided along with ALOHA dispersion model predictions of chemical exposure.

A FRD meteorologist assigned to INL Emergency Response Organization (ERO) Team A participated in a drill at the EOC on September 13. The drill centered on a breach of several glove boxes that contained radiation at the MFC facility. Nowcasts and short term weather forecasts were provided. Several runs of HYSPLIT were also generated to track where the radiation plume may have moved for evacuation support. (Jason.Rich@noaa.gov)

INL Hazardous Weather Alert System

A fairly quiet weather summertime pattern was persistent across the INL during the last few months. As a result, only 11 hazardous weather statements were issued by the NOAA INL Weather Center this last quarter. Seven out the 11 statements were issued for high winds while the rest were issued for lightning. (Jason.Rich@noaa.gov and Dennis.Finn@noaa.gov)

NOAA/INL Mesonet

We revisited the NOAA/INL Mesonet maximum and minimum air temperature calculation procedure in order to more closely align it with other NOAA offices. We decided that maximum and minimum air temperatures should be calculated as a 1-minute averages with the highest and lowest 1 minute average considered as the maximum and minimum value, respectively, during that 5-minute period. Testing continues on the datalogger programming change that will soon be applied to the entire Mesonet.

We are also attempting to determine when a fan on the air temperature sensor aspirator has failed or is about to fail. A non-working aspirator can give misleading results about the stability of the atmosphere that is used for running transport and dispersion models. Typically, the data reviewer attempts to identify stations with faulty fans during the daily quality control. However, identifying these periods is very subjective and not highly reliable. Several mathematical methods for identifying faulty fans have been tested. These look at the smoothness of the temperatures, temperature variation, relationships between tower top and two meter temperatures, and combinations of these. None of the methods has provided consistent results. A direct measurement of fan rotation is also under development. This uses a non-contact Hall effect sensor designed to monitor the rotation of gears by counting the gear teeth. This is mounted over the fan and counts the fan blade passing underneath it. (Roger.Carter@noaa.gov, Jason Rich, and Shane Beard)

A significant amount of lightning damage occurred to equipment located at the radar wind profiler and surface flux site on the INL this summer. The radar wind profiler computer was damaged and had to be repaired. Fortunately, the computer board that was damaged could be replaced with a commercially available product. Several short haul modems, several data termination units, and the LI-COR CO_2/H_2O fast-response sensor were also damaged and were subsequently repaired. Since lightning damage is an on going problem on the INL, a plan was developed to reduce the possibility of damage in the future. New cables have been installed and cables that were laying on the surface of the ground have been buried. Earth grounds have been inspected and repaired on all buildings and several new grounding rods have been added. About $2,000 of lightning/surge protection equipment has been purchased and is being installed so that all power and data lines at the site are individually protected from lightning surges. (Roger.Carter@noaa.gov, Shane Beard, and Tom Strong)

A presentation on bat activities at the INL was presented to FRD staff by Environmental Surveillance, Education, and Research Program staff member Jericho Whiting. There was at first some concern that bat activity at the INL could potentially be interfering with the radar wind profiler. However, it was learned that bats do not fly at altitudes where their activity could affect the radar return pulse. After the presentation, a discussion ensued as to how FRD and ESER could collaborate and help improve bat research at the INL. The NOAA/INL Mesonet towers were offered as a platform for the installation of bat detectors. It was agreed that Mr. Whiting will seek additional funding for these detectors.

OTHER ACTIVITIES

Safety

During the July staff meeting, a touch of fun was had with a game of Safety Bingo.

A video on heat stress was viewed during the August staff meeting.

At the September staff meeting, employees viewed the video "Noise-Induced Hearing Loss, No Second Chance."

Training

In July everyone completed the NOAA-required 2012 IT Security Awareness Course.

Four people from the INL EOC hazards assessment staff and four representatives from the state of Idaho attended an EOC HYSPLIT user training session on 27 August given by Rick Eckman, Brad Reese, and Dennis Finn.

Rick Eckman continues to be involved in the Leadership Effectiveness and Advancement Program (LEAP). A LEAP meeting scheduled for June was canceled due to travel restrictions. To compensate, LEAP has been extended 3 months, with training sessions scheduled in October 2012 and January 2013.

All employees completed the required INL training in September (ES&H Awareness Refresher).

Travel

Dennis Finn traveled to Texas in mid-July for maintenance and data acquisition activities at the three WFIP sites.

Kirk Clawson, Dennis Finn, Shane Beard, and Tom Strong traveled to Texas in mid-September to retrieve the equipment deployed for the WFIP project and end the field measurements.

Outreach

In July Dennis Finn answered an Ask a Scientist question for the Idaho Falls *Post Register* newpaper. The question was related to blue vs. smoky skies.

In August Rick Eckman answered an Ask a Scientist question for the Idaho Falls *Post Register*. The question was related to the causes of high and low pressure systems at the earth's surface.

The Idaho National Laboratory is sponsoring a series of public meetings called *The Energy Debate.* At each meeting a film related to energy policy is shown and then a discussion panel is seated and the audience is given an opportunity to ask questions. On 28 August the first meeting was held with a showing of a documentary called *The Great Squeeze.* Much of the film was related to the sustainability of fossil fuel usage, but a portion involved climate change. Rick Eckman sat on the discussion panel to field questions related to climate.

Personnel

It is with sadness that we note the passing of Ray Dickson, former FRD Director, on August 19, 2012. He was 82. Ray published over 50 research papers and served for 29 years as director of the division. His obituary can be viewed here:
http://www.legacy.com/obituaries/postregister/obituary.aspx?pid=159324894#fbLoggedOut